Applicant's APA the inner surface CF substrate is not in contact with seal spacers 5. Thus, in Applicant's APA, seal spacers 5 thus do not actually function as cell gap spacers. Compare display area spacers 16 which are collapsed so that in the middle of the display screen the cell gap is smaller than the appropriate cell gap, and the cell gap at the peripheral portion is larger than the appropriate cell gap (FIG. 1C). Nowhere does Applicant's APA teach a first spacer that is elastically deformable from an initial size thereof to a size corresponding to an appropriate cell gap and that the first spacer has an initial size in a cell gap direction larger than the appropriate cell gap. Thus, Applicant's APA does not teach the first spacer of independent claims 2, 7, 8 and 9. Furthermore, Shin et al. cannot be combined with Applicant's APA to achieve or render obvious this feature. Applicant's invention relates to a falling-drop method of liquid crystal display manufacture. In such a method, the sealant is not fixed when liquid crystal is filled in the gap, thereby allowing the deformation of the spacer member together with a liquid crystal when the panel is put under atmospheric pressure. In Shin et al., the sealant member 30 is fixed when the liquid crystal is injected into the display (Abstract). Thus, the display manufacturing method of Shin et al. does not relate to the problems Applicant's invention is trying to solve, i.e. the deformation of the liquid crystal display such that a center portion has a narrow cell gap and a periphery portion has a large cell gap. Hence, there is no motivation to combine, and Shin et al. and Applicant's APA cannot be combined to render obvious claim 2 or claims 4-6, which depend directly or indirectly thereon, or claims 7, 8 and 9.

Applicant's APA is further detailed in JP 01-054420, a copy of which was submitted with Applicant's IDS. JP 01-054420 teaches a liquid crystal falling-drop method as illustrated in FIG. 8. Although resin beads are used as the spacer member 12 in this reference, there is no

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teaching about the size of the spacer. JP 01-054420 merely teaches the double-sealing structure, as shown in FIGS. 1 and 4. Thus, Applicant's APA shown in FIG. 1 resembles the above-stated IDS reference, JP 01-054420. It should be noted that the problem with the conventional method shown in FIG. 1B is that the inner surface of the CF substrate 2 is not in contact with the seal spacers 5 which have an initial size equal to an appropriate cell gap in the cell gap direction, and therefore, the seal spacers 5 do not actually function as spacers. This problem is solved by the present invention. In the present invention, the seal spacers 5 are pinched between a pair of substrates 1 and 2 as shown in FIG. 3B and thereby function to maintain the gap between the TFT substrate 1 and the CF substrate 2 at an appropriate value (see specification page 24, lines 14-23).

Furthermore, since the state shown in prior art FIG. 1C is a metastable state, in theory, if the hardening process for seal 4 was suspended for a considerable time, the LCD panel 20 could be deformed such that the cell gap becomes uniform throughout the LCD panel 20 due to the resistance of display area spacers 16. However, in practice, when the seal 4 is left in an unhardened state for the necessary time period for the gap to become uniform under atmospheric pressure, seal 4 may break because pressure is directly applied to seal 4 when the LCD panel 20 is put under atmospheric pressure. Thus, in the APA manufacturing method, once the seal 4 has hardened, the resulting display has a cell gap in the center portion of the LCD panel that is smaller than the appropriate cell gap and a cell gap in the peripheral portion that is larger than the appropriate cell gap (FIG. 1C; specification, page 9, line 9 to page 10, line 1).

Furthermore, a feature of the present invention as shown in FIG. 3A to FIG. 3C, is that the spacers located at a central portion of the panel are deformed together to provide an

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appropriate cell gap. This is in marked contrast to the conventional liquid crystal falling-drop method where the central spacers are excessively collapsed to a size smaller than the appropriate cell gap as shown in APA FIG. 1B.

In addition, Shin et al. cannot be combined with the APA to achieve or render obvious the first spacer of claims 2 and 4-6. As noted above, Shin et al. does not teach or suggest the falling-drop method at all. Although Shin et al. teaches the use of over-sized spacers, its reasons for doing so are not clear from the teaching of the specification. It seems that the size of the spacers is irrelevant to the subject matter of Shin et al., wherein the significant point is that a quantity of liquid crystal material is injected into the cell cavity through the injection hole 60 to expand the substrates 10 and 20 to a non-planar configuration as shown in FIG. 6. Thereafter, the substrates are compressed to a substantially planar configuration, thereby expelling a residual amount of the injected liquid crystal material from the cell cavity out of the injection opening.

In Shin et al., since a sealant 30 must be fixed prior to injecting the liquid crystal, the prior art defect that a cell gap at the central portion of the display becomes smaller than that at the peripheral portions is no longer an issue (FIG. 6). This is in contrast to Applicant's claimed invention, where the seal member has not been hardened when the liquid crystal is filled into the gap, and the spacer member is deformed, together with the liquid crystal when the panel is put under atmospheric pressure to deform the spacer using a difference between said atmospheric pressure and negative pressure inside the panel. Accordingly, the function of the cited over-sized spacers 40 is quite different from that of the spacers of Applicant's APA used in the falling-drop method, and one skilled in the art would not be provided with any motivation to combine these references. Thus, the Examiner is relying on hindsight reasoning in forming a rejection based

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upon Applicant's APA and Shin et al., and the rejection of claims 2 and 4-9 should be withdrawn.

Turning to the rejection of claim 3 as obvious over Applicant's APA in view of Shin et al. and further in view of Hiraishi et al. (U.S. Patent No. 6,204,907), claim 3 is dependent on claim 2. The deficiencies of the combination of the APA and Shin et al. vis-à-vis claim 2 are discussed above. Hiraishi et al. does not cure the above discussed deficiencies. Thus, claim 3 is patentable for the reasons adduced above, as well as for its own limitations.

Having dealt with all the objections raised by the Examiner, the Application is believed to be in order for allowance. Early and favorable action are respectfully requested.

A credit card authorization Form PTO-2038 in the amount of $110.00 in payment of the fee for a One-Month Extension of Time accompanies this Amendment. In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account Number 08-1391.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on March 17, 2004 at Tucson, Arizona.

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